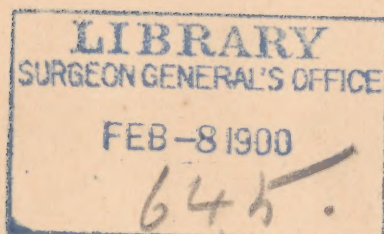


MEIGS (J. A.)

Observations upon the
form of the occiput. xx—



Observations upon the
form of the occiput &c.





OBSERVATIONS

UPON THE

FORM OF THE OCCIPUT

IN THE

VARIOUS RACES OF MEN.

✓

BY

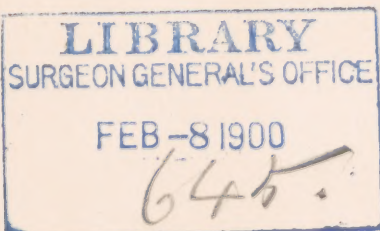
J. AITKEN MEIGS, M. D.,

Professor of the Institutes of Medicine in the Medical Department of Pennsylvania College; Lecturer on Physiology in the Franklin Institute; Physician to the Department of Diseases of the Chest in the Howard Hospital and Infirmary for Incurables; Corresponding Secretary of the Philadelphia County Medical Society; Member of the Academy of Natural Sciences of Philadelphia; Fellow of the College of Physicians; Foreign Associate Member of the "Société d'Anthropologie de Paris," etc.

Observations upon the Form of the Occiput in the various Races of Men.

BY J. AITKEN MEIGS, M. D.

In 1857, the collection of Human Crania in the Museum of the Academy of Natural Sciences of Philadelphia, contained 1,045 specimens of many different races of men. Since that time, by presentation, deposit and exchange, this total has been increased to 1,125. Eighty additions, therefore, have been made during the past three years. Of this number 27 are North American Indians; 1860.]



2 Araucanians; 25 Peruvians; 4 Chinese; 9 Sandwich Islanders; 2 Marquesans; 1 Feejee; 2 Swedes; 2 Thugs; 1 Hindoo; 1 Tehuktehi; 1 Iceland; 1 Cossack and 2 Negroes.

The donors and depositors of these crania are Drs. W. S. W. Ruschenberger, Thomas J. Turner, J. E. Semple, and H. B. Trist, of the United States Navy; Drs. E. H. Abaddie and J. Letterman, of the United States Army; Prof. Wm. A. Hammond, Drs. J. Dickson Bruns, J. H. Slack, J. Clifford Parker, J. B. S. Jackson, and Messrs. George Gibbs, John Biddle, N. P. Buckley, Charles C. Abbott, and the writer of this article.

Forty-six of these crania were procured—some of them with considerable difficulty—by my enterprising friend and former school-mate, Passed Assistant Surgeon Thomas J. Turner, chiefly during his cruise in the Pacific. It affords me much pleasure to acknowledge, thus publicly, the value of his indefatigable and intelligent efforts to promote the interests of craniographic science. The thanks of those interested in this important branch of knowledge are also due to the gentlemen whose names are mentioned above.

Chiefly upon this collection, thus increased in the number and ethnical variety of its specimens, are based the following observations, which, in their general scope and tendency, may be regarded as a continuation of the leading inquiry started in my paper on the Jerusalem skull, which was published in the Proceedings of the Academy for September, 1859.

That inquiry, it may be remembered, was to ascertain whether from the form of the entire skull, or of some characteristic part of it, the race as well as the type to which any particular cranium belonged, could be definitely determined. As the basis of this inquiry, a fragmentary head was selected, having a very peculiar occipital conformation, but whose ethnical origin was wholly unknown. This cranium was subjected to a severe critical analysis and comparison with other heads in the collection. In the course of this comparison, whose leading results have already been communicated to the Academy, the following observations were made, and are now brought forward as another contribution to the sum of recorded human knowledge, and an additional step towards the emancipation of Ethnology from the dogmatism and conjectural assertion with which a host of pseudo-scientific writers have so industriously surrounded it, in their ill-advised attempts to solve definitely certain great questions concerning the origin and primitive affiliations of the races of men.

In the very front rank of ethnological inquiry stands Craniography. As the epitome, not of the skeleton merely, but also of the entire physical man, the cranium, by some of the best observers and profoundest thinkers of modern times, has justly been regarded as capable of furnishing valuable information concerning the zoological relations of the different races of men. This conviction animates the "Cephalogenesis" of Spix, the "Decades Craniorum" of Blumenbach, the numerous and important craniological papers of Retzius, the "Tabulæ Craniorum" of Sandifort, the "Crania Americana" and "Crania Egyptiaca" of Morton, the "Atlas der Cranioscopie" of Carus, the "Crania Britannica" of Davis and Thurnam, the "Organischen Formenlehre" of Lucæ, the "Schädel, Hirn und Seele des Menschen und der Thiere" of Huschke, the "Crania Selecta" of K. E. Von Baer, and most recently of all the "Catalogus Craniorum Diversarum Gentium" of Prof. J. Van der Hoeven, of Leyden, well known as an able observer and a zealous cultivator of the natural history of man.

It must be confessed, however, that owing to the limited number of specimens in the various cranial collections, and the genealogical uncertainty which surrounds many of those which have been figured and described by different observers, craniography can, as yet, boast of but few established principles. The cranial descriptions published by Blumenbach and many of his successors are entirely too brief and vague for the purposes of that exact

[Sept.

and minute comparison, which alone can lead to any really important results. Before the deeply interesting and complicated questions of ethnology can receive much light from craniography, the latter must furnish extensive comparisons of the heads of different races of men, not in respect to their general form only, but with reference to the exact conformation and minute anatomical peculiarities of each of the several natural regions of the skull—the crown, base, occiput, facial and lateral aspects. Convinced of the truthfulness of this statement, I have attempted, in the following pages, a comparison of the heads in the Morton collection, with reference to their occipital peculiarities only, hoping, at some future time, as leisure permits, to institute, in like manner, a comparison of these heads with regard to their coronal, basal, facial and lateral characters successively.

A peculiar flattening of the upper or parietal portion of the occipital region characterizes the heads of Norwegians (1260),* Swedish peasants (117, 1247, 1249, 1258, 1486 to 1488), Finland, Södermannland, Turannic and Cimbric Swedes (1545 to 1549, 121, 1532, 1550, 1362), Ostrogoths (1255), and Swedish Finns (1542 to 1544). From about the middle of the sagittal suture the parietal bones slope or shelve away posteriorly, so as to form an inclined plane, which modifies or interrupts the regular ovoidal form of the head, and terminates, in most instances, at the lambdoidal suture, or a little below it, on the superior portion of the os occipitis.† The occipital protuberance in all these crania is very well marked; and in some, apparently exaggerated by the peculiarity above mentioned. In the two “ancient Cimbric” skulls (1532, 1550), in a very old Cimbrian head (1362), from the Danish island of Möen, in the Baltic, and in the crania of an Ostrogoth (1255), and a Swedish woman of the 13th century (1249), the knob-like protuberance of the occiput gives to the calvaria a peculiarly elongated and kumbe-kephalic or boat-shaped form. This occipital prominence is also seen in a fragmentary Burgundian head (1533), from a tomb near Lausanne, in Switzerland, but is not so well marked.

From the investigations of Prof. Nilsson, it would appear that the aborigines of Scandinavia, had “short heads, with broad and flattened occiputs,”—features exhibited by other ancient people, such as the Lapps and Samoides, the Iberians or Basques of the Pyrenees, and the mysterious Pelasgi, whose traces are still found in Greece. The short-headed race of Scandinavia appears to have been followed by another race of men, whose skulls were characterized by prominent and narrow occiputs.‡ The hind-head of a large Danish cranium, figured by Nilsson,§ after Eschricht, of Copenhagen, is full and rounded.

In the skulls of “true Finns” (1534 to 1541, 1252, 1259), the occiput is neither prominent nor depressed, but flatly round, and in keeping, therefore, with the general globularity of the head. The Finnic cranial type appears to be preserved in its greatest purity among the primitive inhabitants of Esthonia. Dr. Hueck, in describing the head of an Esthonian, says, that

* The numbers inclosed in brackets are those by which the skulls are designated in my *Catalogue of Human Crania* in the collection of the Academy of Natural Sciences of Philadelphia.

† This conformation also pertains to the Greenland, Scandinavian and Cretin skulls, figured in Tables 3, 4 and 6, of Carus' *Atlas der Cranioscopie*, Heft 1. I find it also more or less strongly pronounced in the crania represented in Tables 3, 4, 8 and 9, (*Schädeln abnormer Form*), and 1, 3, 6, 9, 10 and 11, (*Schädeln bekannter Personen*) of the *Architectur des Menschenschädels*, of Dr. Luce.

‡ Report of the British Association for the Advancement of Science, for 1847, p. 31.

§ Skandinaviska Nördens Urinvanare, ett försök i comparativa Ethnographien af S. Nilsson, Phil. Dr. etc., Chistianstad, 1838, i. Häfvel, plate D, fig. 10.

the occiput, in the region of the superior linea semicircularis, is strongly arched, both posteriorly and towards the sides.*

The well-characterized Norwegian and Swedish skulls in the Museum of the Academy have the basal portion of the occipital region quite flat, and parallel with the horizon, when the head rests squarely upon the lower jaw. The lower part of the occiput in the German heads is more prominent than in the Finns, less than in the Swedes, and still less than in the Cimbri; while the upper part is less flat than in the Swedes. The occipital region of the German skull, in point of conformation, occupies a place intermediate between that of the Swedes and Finns.

In the skull of a Dutchman (434), born in Utrecht, the posterior or occipital region is flat and broad, and presents to the eye a somewhat pentagonal outline.

The Anglo-Saxon and Anglo-American crania, though, like the Swedes, longer than the Germanic and Finnic skulls, have nearly the same rounded occiput as these latter. The parietalia of an Anglo-Saxon skull, figured in the first Decade of *Crania Britannica*, incline downwards and backwards towards the occiput, as in the Norwegian east referred to above. The occipital bone is full and rounded, and has a considerable projection posteriorly.

Most of the skulls in the collection, marked "Celtic Irish," exhibit the same downward and backward inclination of the upper or parietal portion of the occipital region as described above. The occiput of No. 18 has the same boat-like shape as that of the Ostrogoth (1255) and the Cimbri (1532, &c.). The occipital region of No. 42 differs from that of the preceding in being a little fuller. The same shelving of the upper occipital region is also present in Nos. 52 and 1186. It is also exhibited, though less markedly, in No. 1356, and still less in No. 985; while in No. 986, the occipital type approximates the Swedish form, being rounder, fuller, less inclined, and having the protuberance not so prominent. In several respects these skulls correspond with those found in the cromlechs or sepulchral mounds of Ireland, and described by Mr. Wilde as possessing the projecting occiput, which characterizes the dolicho-kephalic crania, found in ancient Danish tumuli. It would thus seem that the earliest inhabitants of Ireland, like those of Scandinavia, had short heads and flattened occiputs, while the people who succeeded them were remarkable for long, oval heads and prominent occiputs. Wilson and Bateman, on the contrary, have concluded, from their investigations, that the primitive people of Scotland and England possessed long, kumbe-kephalic or boat-shaped heads, peculiarly characterized by a narrow prolongation of the occiput in the region of the cerebellum. Prof. D. Wilson is inclined to regard this peculiar form of the hind-head as diagnostic of the primitive Caledonians. I find it equally well pronounced, however, in two Egyptian skulls (Nos. 837, 838), from the Pyramid of Five Steps, at Saccara.

In an ancient Briton, of the brachy-kephalic type, figured in *Crania Britannica*, the "occipital bone is somewhat full above the protuberance, which, itself, is strongly marked." In another ancient Briton, belonging to the dolicho-kephalic class, and represented and described in the same work, the occiput is full, prominent and rounded, and presents a strongly-marked transverse ridge.

Three oblong skulls from the catacombs of Paris (661, 662 and 663), have the occiput flattened almost vertically. In No. 663, the upper part of the occipitis presents a lozenge-shaped prominence, which, though flattened itself, somewhat destroys or interrupts the general perpendicularity of the back part of the head. No. 664, also from the catacombs, is a brachy-kephalic head, with a markedly perpendicular and wall-like flatness of the occiput. This head, I am inclined to think, is that of a Basque or Iberian of the Pyrenees.

There are no Spanish skulls in the Academy's collection. The private

* De Craniis Estonum Commentatio Anthropologica, etc., p. 7.

collection of Prof. Van der Hoeven contains several from Grenada, Catalonia, &c. Of one of these, No. 31, he writes in his catalogue,* "*Occipitis pars superior gibba*," and of another, No. 32, "*os occipitis supra gibbum*." In describing a Lusitanian skull, he says, "*Occiput gibbum; lineæ semicirculares et protuberantia occipitalis vix distincta*."

In the asymmetrical Slavonian skull from Olmutz in Moravia (1251), and in No. 1253, a Slave from Morlack in Dalmatia, the occiput is flatly globular or truncated. If classified according to its form, No. 1251 might be placed between the Turkish and Kalmuck types.

In a Polish skull in Prof. Van der Hoeven's collection, the occipital region is prominent at the apex of the lambdoidal suture. The occiput of another Poland skull is broad and gibbous in the upper portion.

In the Turkish skull figured by Blumenbach (table 2) the external occipital protuberance is but little developed, so that there seems to be no occiput. Two Turkish skulls obtained from a burial ground at Scutari, and described by Dr. Williamson,† have a rounded occiput.

In a Cossack skull (133) from Balaklava, the occiput is broad and very flat.

In the Hungarian cranium, according to Edwards,‡ the back of the head appears flat, forming almost a straight line with the nape of the neck.

A cast of the skull of a young Greek (1354), exhibits a moderately full and rounded occiput. In the Greek skulls, in the Chatham collection, the "*occiput* is well rounded, and does not, in general, project; the space for the downward projection of the brain in the occipital region is well developed."

The cranium of a Roman prætorian soldier, figured by Blumenbach,§ has the external occipital protuberance very broad and prominent. In the skull of a Roman soldier,|| taken from an ancient cemetery at York, the occiput is broad and rounded, and the protuberance rather prominent. So also in the Roman cranium described by Dr. Thurnam,¶ the occipital bone is full and prominent, especially in its upper half.

In an Etruscan skull in the Galerie Anthropologique at Paris, the occiput is full and rounded.**

The general form of the occipital region of the so-called Phœnician skull (1352) is like that of the Norwegian. In the latter, however, the external occipital protuberance, and the superior curved line are strongly pronounced; in the former the skull is quite smooth at this place.

All the Circassian skulls exhibit great fulness of the occipital protuberance. The upper part of the hind-head is flat. The occiput as a whole is rounded in the Armenian skull, No. 789, and in this respect is like the Persian skull, No. 731. Nos. 790, 791, 792 (Armenian) are longer and more angular heads, and owing to the prominence of the occipital protuberance, are more like the Circassian skulls. In Nos. 792 and 794, also Armenian, the occiput is flatly round. The rather short and angular Parsee heads, exhibit a rounded occiput—very well shown in No. 731, but less marked in No. 743, owing to the general prominence of the occipital bone. The form of the occipital region in the Afghan head, is like that of the Armenian and Circassian.

The Baluchi and Affghan heads in the Chatham collection have the "*occiput*

* *Catalogus Craniorum Diversarum Gentium quæ collegit, J. Van der Hoeven. Lugduni Batavorum, 1860.* This valuable catalogue contains a brief account of 171 human crania and 39 casts, with the principal measurements of all the skulls.

† *Observations on the Human Crania contained in the Museum of the Army Medical Department, Fort Pitt, Chatham.* By George Williamson, M. D., Dublin, 1857.

‡ *Des Caractères Physiologiques des Races Humaines.* Par W. F. Edwards, 1829.

§ *Decades craniorum.* Tab. 32.

|| Described by Retzius in Müller's *Archiv. für Anat., Phys., etc.* Jahr. 1849, p. 576.

¶ *Crania Britannica, Decade I.*

** See *Cranial Characteristics of the Races of Men, in Indigenous Races of the Earth,* p. 313, for a drawing of this skull.

well rounded, and the space for the downward development of the brain considerable." The occiput of a Candahar skull is "broad, flat and perpendicular, giving the skull something of the appearance of the flat-headed American Indians, although in a much less degree."

The Afghan head, as a whole, resembles, in several respects, the Hindoo type.

The ancient Assyrian skull is full and rounded in the occipital region.

The Egyptian skulls differ among themselves as regards the form of the occiput. Of the series termed "Græco-Egyptians" by Dr. Morton, Nos. 799, 801, 804, 812, 815, 821, 824, 856, 837, 838, 840 and 875, possess, in general, the same occipital form as is seen in the Swedish crania referred to above. Nos. 798, 808, 814, 817, 825, 850, 859, 868, 873, 884 and 893 have the occiput less ovoidal in shape and more rounded, owing to the external occipital protuberance being less prominent. These latter skulls are, in general, broader than the former, and exhibit a somewhat different configuration of the crown. The same difference is observable in the other groups of skulls representing the Egyptian race in the Academy's collection. Thus of the Ancient Theban Egyptians, Nos. 48, 60, 844, 846, 855, 862, 876, 1044, 1293 and 1295 exhibit a more or less rounded occiput, while in Nos. 847, 848, 849, 851, 853, 854, 860, 866, 867, 871, 880, 881, 882, 883, 887, 889, 894 and 1290, the occiput is either shelving, as in the Swedish skull, or elongated, owing to the great protuberance of the occipital boss, as in the kumbe-kephalic crania above alluded to. According to Dr. Morton, No. 1044 may serve as a *type* of the genuine Egyptian conformation. He describes it as a long, oval cranium with a receding forehead, gently aquiline nose, retracted chin, and a marked distance between the nose and mouth—features all characteristic of the monumental Egyptian. He makes no allusion, however, to the configuration of the occiput, which, as will be seen by referring to the wood cut on p. 17 of "*Crania Egyptiaca*," or p. 38 of my Catalogue, is quite peculiar. Some idea of the variety of occipital forms among these Egyptian skulls, may be obtained by comparing together the wood cuts in my Catalogue representing Nos. 812, 878, 1044, 888 and 877 of the collection. Dr. Morton's descriptions of the Egyptian skulls are, in general, very brief. He seldom alludes to the shape of the occiput. He notices the "tumid" occiput of No. 871, and the "full" occiput of No. 867. The occipital region of Nos. 861 and 886 is intermediate in shape between the elongate and rounded forms. Of the ancient Egyptians from the Necropolis of Memphis, Nos. 1223, 1235, 1519, 1520, 1521 and 1522 possess a rounded occiput. In all the rest the posterior part of the head is elongated and flattened superiorly. This elongation is particularly well marked in Nos. 809, 810, 811, 813, 1201, 1291, and also in No. 819 from Arabat el-Matfoon, the ancient Abydos. In all these skulls the external occipital protuberance is exceedingly prominent. This statement applies also to three embalmed Egyptian heads found by Mr. Wm. A. Gliddon in a rock-tomb located about four miles west of the city of Alexandria, and belonging, probably, to the Ptolemaic era. Among the Memphite Egyptian skulls is one (No. 806) which is altogether peculiar and unlike the other heads of this series. It has a broad, low and flat occiput, while the coronal region is decidedly Gothic in its outline. All the crania obtained from the tombs opened by Prof. Lepsius at the base of the great Pyramid of Gizeh, are long, oval heads, with protuberant occiputs, flattened superiorly. Three Kens or ancient Nubians from the pits at Debôd, (827, 828, 829) exhibit the protuberant, shelving form of occiput. The hind head in No. 828 is exceedingly elongated. Dr. Morton speaks of the very full occiput of this skull. He makes no allusion to the occipital form in his descriptions of the others. The occiput of No. 826 is rounded. Two crania (830, 831) of ancient Egyptians, from the pits at Koum Ombos, have a rounded occiput. A third, No. 832, has the occiput superiorly flattened. The Academy's collection contains four skulls of ancient Egyptians, obtained by the late Mr. G. R. Gliddon from the crocodile mummy-pits called Margaret-es-Sa-

[Sept.

moun, behind the village of Maabdeh, and opposite to Manfaloot. Three of these, Nos. 834, 836 and 1292, have the shelving occiput: in the fourth, No. 833, the occiput is rounded. Among the Egyptian skulls grouped in the Catalogue under the head of *Miscellaneous*, there is one (No. 822) which differs considerably in its general form and characters from the skulls with which it is associated. It was obtained by the late Mr. Gliddon from a tumulus at the Island of Beggeh, the ancient Senem, a sacred spot close to Philæ in Nubia. Mr. Gliddon seems to have regarded this skull as that of "a pilgrim to the Temple." The configuration of the crown is triangular, while the occiput is almost vertically flattened. Of the four other heads in this group, Nos. 802 and 1240 possess the rounded form of occiput, while in Nos. 803 and 1317 the hind-head is superiorly flattened.

The dolicho-kephalic Hebrew skulls in the collection, exhibit an occiput more or less regularly rounded, as is very well seen in Nos. 818, 842, 845, 865 and 870. In the oblong and somewhat angular head, No. 807, the basal portion of the occiput is perceptibly flattened, and the occipital protuberance somewhat more prominent than in the other skulls of this group.

In the Arab skulls the occiput is broad and flattened. In No. 781 the occipital region is flattened superiorly, as in the Norwegian and Swedish crania, and the occipital protuberance quite prominent. In No. 784 the head widens out behind the mastoid processes, giving the occipital region a full and rounded appearance. In No. 780 the occiput is flattened.

The Fellah skulls have very prominent occiputs, the occipital protuberance being more or less strongly marked. The Coptic skull exhibits great breadth and fulness of the whole posterior region.

The occiput of the cast of an Abyssinian skull in the collection (1361) is quite prominent: the hind-head shelves downwards and backwards somewhat like that of the Swede.

The occipital region of the Guanché cranium (23) is full and prominent.

The Hindoo skulls in the collection, also vary in the form of the occipital region. Some of the Ayra, Brahminic or high caste heads of this group, such as Nos. 1329, 1331 and 1335 exhibit the Swedish form of occiput; others (Nos. 1330, 1384) the rounded shape. In four Thugs, the occipital configuration is intermediate between these two forms. In No. 1332 the occiput is almost vertically flattened. In 11 Bengalee crania, (Nos. 6, 25, 31, 81, 411, 413, 432, 443, 444, 948 and 1312) the occiput is flatly round. In 21 others (Nos. 4, 5, 8, 19, 20, 28, 32, 49, 51, 111, 410, 442, 547, 553, 554, 665, 1309, 1310, 1311, 1344 and 1554) posterior part of the head is superiorly flattened and inclined. In No. 20 the whole os occipitis stands out very prominently, and is separated from the ossa parietalia by numerous wormian bones. This feature is also seen, to some extent, in Nos. 1309 and 1310. Such a form of the occiput is very well exhibited in plate 20, fig. 1, of the Atlas to Vimont's *Traité de Phrénologie Humaine et Comparée*. In No. 29, a peculiar and asymmetrical skull, the occipital bone appears as if pressed from behind and beneath forwards and upwards. The hind-head of No. 1047 is almost vertically flattened.

In certain crania from the Indian Peninsula, Dr. Williamson says that the posterior part of the skull is large, and the occiput prominent; the space for the downward development of the brain of moderate extent. Two Hindoos and a Thug have the occiput prominent. In five crania from Ceylon, the occiput is well rounded.

There are thirteen Chinese skulls in the Academy's collection. Of these, Nos. 94, 550, 669, 670, 1526, and 1527 exhibit the elongate, shelving form of occiput, very well represented in the wood-cut on p. 47 of my *Catalogue of Human Crania*. In Nos. 3, 56, 426, 427, and 1028, the occiput is rounded, and in No. 1336 vertically flattened. The Chinese crania in the Chatham Museum have the occiput rounded and not prominent. According to Blanchard, in the Chinese skulls figured in Dumoutier's Atlas, "la région occipitale 1860.]"

sale s'étend peu en arrière.¹⁾ Blanchard informs us that this character is exhibited in many of the specimens of this race, contained in the anthropological collection of the Muséum d'Histoire Naturelle de Paris. In all these specimens he found the posterior part of the head a little less elongated than in the inhabitants of the Philippine Islands.²⁾

In a *Japanese skull* (667) the hind head is rounded; in two *Loachian crania* (672, 673) it is shelving.

In two *Burmese crania*, (661, 667) the occiput is round and moderately full. The occipital region of a *Siamese skull*, from Bangkok (123) is broad and flat, and slightly resembles that of the Malay head.

Some of the *Malay crania*, (41, 1186, 1515, and 1525,) have elongate or shelving occiputs; in others, (46, 47, 201, 433, 543, 1338, 1349, 1841, 1693,) the occipital region is more or less flatly round; and in others still, (424, 425, 428, 429, 430, 456, 495, 544, 546, and 1577,) it is more or less globular. In Nos. 346 and 1340, the occiput is compressed behind, and somewhat beneath, so as to form a sort of inclined plane, sloping downwards and forwards, to the foramen magnum.

Nine *Burmese* and *Malay crania* in the Chatham collection have the occiput broad and well rounded; and the space for the downward development of the cerebellum in the occipital region extensive. In one *Burmese skull*, the posterior part of the head is large, and the occiput straight. In a *Japanese skull* the occiput is small, flat, and almost perpendicular. This is true also, of some of the *Malay skulls*, and of two *Burmese* described by Dr. Williamson, in the appendix to his catalogue.

Forbes, in describing the tribes of the Indo-Gangetic, or Indo-Chinese Peninsula, says that "the occipital fossæ in all are placed so far back that from the crown to the nape of the neck is nearly a straight line."³⁾ According to Dr. Ruschenberger, the occipital portion of the *Siamese skull* is nearly vertical, and compared with the anterior and alveolar division, very small. In the inhabitants of *Cochin China* or *Annam*, according to Morton, the occipital portion of the head is more elongated than in the *Siamese*.

Only one (1651) of the *Lapland skulls* in the Academy's collection has the shelving occiput; all the others, (1250, 1257, and 1332,) possess a broad and flatly rounded occipital region.

All the *Eskimo crania* in the collection have narrow, elongate, or oval occiputs. In an *Eskimo skull* at Chatham, the "occiput is narrow and prominent."

In the *Tchukotka crania* brought from Behring's Straits by my friend, E. M. Kern, Esq., the occiput is prominent and shelving. The skull of an *Atanian*, from *Unalakshik*, contained in the *Rijk's Museum of Natural History*, at Leyden, and figured and described by Prof. Van der Horst, has a prominent occiput.

The occipital region of a *Kamukaskan cranial case* (755) is full and prominent. In the skull of a *Northern Eskimo Tungus*, figured by Blumenbach, in *Table xvi* of his *Disquis. Craniorum*, "the occiput is remarkably prominent, so that the distance between the external occipital protuberance and the superior induræ is equal to nine inches."⁴⁾ The *Kalmuck* (1553) and *Burak skulls* (1355) have globular occiputs.

The occipital region of the skull of an *Islander* (125) is full, prominent, and shelving.

¹⁾ Voyage en Pale Sud et dans l'Océan, &c. Anthropologie. Par Emile Blanchard. Paris, 1854.

²⁾ Embassy to Siam and Hue, p. 220.

³⁾ A voyage Round the World, including an Embassy to Moscow and Siam. By W. S. W. Ruschenberger, M. D. Philada., 1828, p. 209.

⁴⁾ Beschryving van Drie Merkwuerdige Menschelyke Schedels uit het Rijk's Museum van Natuurlyke Histore te Leiden. Door J. Van der Horst.

Four of the Kanaka skulls in the collection, (564, 695, 1300, and 1308,) have elongate or shelving occiputs. In three others, (566, 572,) the occiput is rounded. In two skulls from Oahu, (1023, 1024,) the occipital region is prominent; in another (1022) it is more rounded. Three Tahaitian crania (1017, 1019, 1020,) exhibit protuberant and shelving occiputs. In two other Tahaitian heads (1016, 1021) the occiput is more rounded, and in still another (1018) it is broad and flat. The crania of Sandwich Islanders, in the Chatham collection, possess rounded occiputs. In an Otahaitian skull the occiput is prominent.

There are three Marquesan skulls in the Academy's collection. In one of these, from Nukahivah, the occiput is narrow and shelving, and the occipital boss quite protuberant. In another, also, from Nukahivah, and a third from Christina, the occipital region is fuller and less prominent.

All the New Zealand crania in the Academy's collection exhibit the elongate and narrow form of occiput. In five New Zealand skulls in the Chatham Museum, "the occiput is not prominent, but well rounded off."

In a Feejee specimen from Bau, (1029) the occipital region is narrow and protuberant.*

Three Arickaree skulls, of the Upper Missouri, exhibit the same shelving occiput and prominent occipital protuberance, seen in the Swedish, Cimbric, and Ostrogoth crania. They are long, oval skulls, and resemble, in their general configuration, the Swedish crania, as may be seen by comparing together No. 649 (Arickaree), and No. 1247 (Swede). One of the Arickaree skulls (No. 748), presents a somewhat modified occipital form. It is like that represented in plate 35 of *Crania Americana*, or fig. 2 of plate 96 of Vimont's Atlas. The superiorly flattened form of the occiput is also seen in the Assinaboin skulls, though less strongly marked. These crania are broader and less oval than the preceding. The same occipital form is also very well marked in Nos. 632 and 635 of the Cherokee group. These two crania are long ovals. In the other specimens of this group, the occipital protuberance is less prominent, and the whole hind-head more evenly rounded in the line of prolongation of the sagittal suture. These Cherokee skulls differ from each other in several particulars. In two Chetimache skulls, from Louisiana, the occipital region is flattened nearly perpendicularly from the superior spinous ridge upwards. In the Chippeway or Ojibway skull, No. 684, the hind-head is shelving; in No. 683 it presents a different form, as seen in plate 28 of *Crania Americana*. Two of the Kootenay crania (Nos. 744, 745), have the occiput protuberant and elongated. In No. 1227 the hind-head is flat. Two of the Creek skulls (Nos. 441, 579), are short heads with broad, globular occiputs. No. 751, a long, oval skull, has the superiorly flattened hind-head and prominent occipital protuberance well marked. In its general form, this head strongly calls to mind the Cimbric type or configuration. In No. 1454 the occiput is rounded. Dr. Morton, writing in 1839, says that "the present Creek nation is said to embrace the remains of no less than fifteen different tribes, which they have conquered at various times." This fact may explain the discrepancy in forms exhibited by the different specimens of this group. The Dakota skull (No. 605) has a globular occiput. In No. 112, the occipital region is very much elongated and shelving, as in the Creek skull (No. 751). The occiput of No. 204, resembles that of the Cayuga skull, figured in plate 35 of *Crania Americana*. The Huron cranium (No. 15) is beautifully lithographed in *Crania Americana*, pl. 37. Reference to it will show that the occiput is so flattened as to slant or incline from above downwards and backwards, and to

* One-half of the crania contained in the Polynesian group of the Morton collection were procured by Dr. Thos. J. Turner, who is preparing a monograph on the cranial and other physical characteristics of this interesting race, several varieties of which he was able to study practically during his cruise in the Pacific.

occupy a position between the shelving occiput of the Swede and the vertically flattened form. Nos. 1217 and 1218 exhibit the same form. No. 807 approximates the shelving, or superiorly flattened shape. The exact form of the hind-head cannot be determined in the Illinois crania in the Academy's collection, for the whole of this occipitis is wanting in No. 1010, and the greater part in No. 1051. In the former, the occiput appears to have been shelving; in the latter, flatly round or globular. In two *Leopards skulls* (Nos. 15 and 110), the occiput is elongated and shelving. In a third (No. 389), it is almost globular. Of the Lenape, or Delaware Indian skulls Nos. 40, 115, 118, and 1205, possess an elongated occiput, such as is seen in plate 32 of *Crania Americana*. In No. 418 the posterior region is rounded, and far less prominent. In Nos. 1255, 1562 and 1563, the hind-head is broad and squarely flattened. In No. 1294 the occipital protuberance is prominent and knob-like. No. 398 is flatly round in the occipital region. In all the Mandan and Minutari skulls, the form of the occipital region is very similar to that of the *Archæans* and *Assiniboins*. The form of the occipital curve among the different specimens of the *Missourians* group. Nos. 55, 54, 78, 444, and 665, exhibit the form seen in the Huron skull, figured in *Crania Americana*, plate 37. The other two (Nos. 1220 and 1224), are more elongated behind. No. 1068 of the Miami group, has an occiput like the Huron cranium just alluded to. In 1250 the hind-head is perpendicularly flattened. All the rest of this series exhibit the elongated form. In the three *Medaw's crania*, the occiput is superiorly flattened, and the occipital protuberance prominent. Two *Mogot skulls* (138, 139), are brachycephalic, with very flat occiputs. The *Naragansett skulls* in the collection differ from each other in the form of the occipital region. In No. 959 the hind-head is elongated. In No. 951 it is shelving, all that part of the occipital bone above the superior spinous ridge being tumid. The posterior part of the head, in Nos. 952 and 954, shelves or inclines from above downwards and backwards. In the latter skull the occipital base is very protuberant. In No. 945 the occiput is full and rounded, instead of being elongated, as in the others. This is true, also, of Nos. 946 and 947. In the latter, the occipitis is somewhat pressed forwards under the parietalia. No. 1040 is a very peculiar, oblong head; the shelving and elongated occiput projects far behind the external auditory meatus, and the base-occipitis is quite flat. Nos. 955 and 957 have pointed or acuminate occiputs, which appear to be posthumously distorted. In No. 955 the left side of the occipital bone is flattened; in No. 947, the right. In the former the left side, and in the latter the right, appears to have rested upon the ground for a very long time, and to have been flattened by the weight of the superincumbent bones of the head. This damage gives an accumulated appearance to the occiput, the point being to one or other side of the median line. Since the publication of *Crania Americana*, craniographers have been familiar with the vertical flattening of the occiput in crania of the *Natchez* tribe. This peculiar flatness is well shown in No. 1106. The shelving occipital form is shown in all the *Natchez skulls*. Of the *Ojibwa crania*, No. 34 is a short, angularly round head, with an occiput almost vertically flattened. In No. 699, a larger head, the tumid occiput gives a shelving form to the hind-head, seen in profile. In the *Ojibwa* the occiput is broad and flatly round, and approximates strongly, the globular form exhibited in the *Lepus* and *Kalamuck*. The same form is exhibited in the round-headed *Ottawa*, No. 1007. In the other two *Ottawa skulls*, the hind-head is shelving. In the round-headed *Ottawas*, the occiput is globular. In No. 415 of this group, this globular shape is destroyed by the tumid occiput. The two *Pawnee skulls* contrast strongly with each other in the shape of the occiput, which in No. 640 is flatly round, and in No. 1043 is extensively elongated and shelving. In two *Pawnee skulls* the occiput is rounded. Of the *Petersonville crania*, No. 657, as shown in plate 34 of *Crania Americana*, has an angularly round

occiput. In No. 736, a short, triangular skull; the occiput is flat. In the broadly oval cranium (No. 737), the hind-head is rounded. In No. 1352 the hind-head approximates the shelving type. The two Sauk skulls are unlike each other in the shape of the occiput. No. 561 has a broad, though protuberant hind-head. In No. 1246 the occipital region is rounded. The Seminole Indians are represented in the Academy's collection by sixteen skulls. No. 456 (figured in *Crania Americana*, pl. 24), is a round head, with a full and somewhat angularly rounded occiput. In No. 604 the knob-like protuberance of the occipital bone destroys the rounded form of the hind-head, and gives the latter a different shape, as will be seen by comparing the first cut on page 166 of *Crania Americana*, with plate 24 of that work. In No. 695 the hind-head is elongated and shelving. In No. 707 it approximates in its lower part the globular form, and is in striking contrast with No. 456, as may be seen by comparing together plates 23 and 24 of *Crania Americana*. In No. 708 it is more elongated and less broad, and in No. 754 rather flatly rounded. No. 726 is a short head, with a full, broad, but somewhat shelving occiput. No. 727 possesses a narrow and prominent occiput, which is wider between the parietal bosses than at the base. In No. 728 the occiput is fuller and more rounded. In No. 729 the hind head is rather narrow below, and protuberant. In No. 730 the occiput is broader at the base than above, and quite pointed. In Nos. 732, 733, 753,* and 1286, the occiput is protuberant and shelving above. A Shawnee skull, No. 606, has a very narrow, protuberant, and symmetrical occiput; the left, basal part of the occipital bone being flattened, perhaps posthumously. In No. 691 the occiput is flattened vertically on the right side. In No. 1210, a narrow, and highly arched skull, the hind head is narrow, and the upper part of the occipital bone prominent. The Shoshone skulls in the collection are not alike in the form of the occiput. No. 1446 exhibits a broad and somewhat flatly rounded hind-head, appearing as if pressed under the parietal bosses; the upper and posterior part of the head, just between the parietal protuberances, being broad and very elevated. In No. 1447 the occiput is protuberant and shelving. In No. 1448 the occiput is broad at the base, and flattened, though not vertically. No. 1449 possesses a rounded and not very prominent occiput. Two Upsarooka skulls, (Nos. 1228 and 1229), have the hind-head shelving, and the occipital base very prominent. In the Winnebago cranium (No. 559), the occiput is broad and globular. In No. 560 it is less broad and more projecting. In the Yamasse skulls (Nos. 1214 and 1215), the occiput is narrow and rounded. In No. 1216 it is broad and rounded, almost to globularity. There are four skulls of California Indians in the collection.† No. 1514 exhibits what may be called a pyramidal occiput. The occipital bone above the superior spinous ridge is very prominent, and constitutes a common centre, towards which the parietals slant from above downwards and backwards, and also at the sides, and the basal portion of the occipital bone upwards and backwards, somewhat after the fashion seen in some of the elongated Peruvian heads. No. 1027, a female cranium from Maré Island, California, is a long, narrow head, with a narrow and oval occiput. No. 943, also from Maré Island, exhibits a shelving occiput.

Of the crania marked "miscellaneous" in the Catalogue, No. 416, from a mound on the Upper Mississippi, possesses a narrow and prominent occiput. This skull is represented in plate 52 of *Crania Americana* in such a position that, at first sight, the occiput appears full and rounded. But if the observer will place his hand over the lower jaw, so as to hide it, and then hold the lithograph in such a manner that the base of the skull shall be parallel with

* The last skull of the Seminole group should be numbered in the Catalogue, 753, instead of 1556.

† Two of these are enumerated in the published Catalogue. The other two have been added to the collection by my friend, Dr. Thos. J. Turner, of the United States Navy, since the Catalogue was printed.

the plane of the horizon, he will then see that the head is in reality a long one, and that the occipital region is prominent and not round. No. 1227, from Illinois, is a broad, asymmetrical head, flattened behind slightly, and rather to the left. Nos. 1815, 1816, and 1811 have broad, prominent, and somewhat shelving occiputs. No. 420, from the Cave at Steubenville, Ohio, has a low, broad occiput, flattened on the right side. In No. 439, also from the Cave-temple at Steubenville, the broad occiput is almost vertically flattened. In Nos. 437 and 438, also from Steubenville, the occiput is low, broad, and vertically flattened. The former is asymmetrical. The occiput is slantingly flattened in No. 439. No. 210 is wanting in symmetry. The occiput is flattened on the left side, perhaps posthumously. It appears to have been originally moderately full and rounded. In No. 658 the broad occiput is asymetrically flattened to the right of the median line. No. 723 also non-symmetrical, has a low, broad, and vertically flattened occiput. In No. 53, from a mound at Carleville, the occipital protuberance is prominent, and the hind-head shelving. No. 1287, from a mound at Chillicothe, has a broad occiput, slightly truncated or flattened, directly behind. No. 1988, from the same place, occiput shelving and very protuberant. No. 992, from a mound in Tennessee, broad, asymmetrical, and perpendicularly flattened or truncated. No. 1270, from Detroit, occiput shelving and protuberant. No. 1171, from Ohio, occiput broad, and flattened directly behind. No. 1272, found with the preceding, occiput moderately prominent. No. 1455, from a mound in Florida, a very mis-shapen skull, with a low, broad, and asymetrically flattened occiput. No. 417, Cayuga, of New York; occiput elongated and prominent. No. 1041, a Cayenne of Missouri; occiput shelving and protuberant. No. 211, from Missouri; a broad and flat head, with globular occiput. No. 997, Chemesyan, from the N. W. coast of America; occiput full and rounded. No. 22, young Cherokee female, of Georgia; occiput protuberant and shelving. No. 38, Euchee Indian, of Florida; occiput full and rounded. No. 212, one of a Kenshawba skull; occiput vertically flattened. No. 27, Mameogaka Indian, of Peterboro', Upper Canada, and No. 464, Mingo Indian, from Ohio; occiput elongated and shelving. No. 1219 Nantushke, (?) from the Wyoming Valley; occiput full and globular. No. 1467, Naumkong, of Massachusetts; occiput narrow and prominent. No. 25, Quassa warrior; occiput flattened; occipital base prominent. No. 1038, Pennson Indian; occiput fairly rounded. No. 26, Quinaplack (Mohogan) Indian; occiput globular. No. 1516, Seneca Indian, from New York; occiput broad and truncated, or flattened directly behind. No. 1467, from the banks of the Susquehanna; form of the occiput very much like that of the California head (No. 1514). In Nos. 218 and 219, the occiput is shelving and protuberant. The same form is seen in the Maya skull (No. 709). The Aracamen skull (No. 661) has a full and rounded occiput. In No. 652 the occiput is arched. In No. 654 the occipital region is square and truncated, or vertically flattened, as is well shown in plate 28 of *Cranes Association*. In Nos. 616 and 616 the occiput is moderately full and rounded. In No. 666 the hind-head is fuller than in the preceding, and the occipital protuberance more prominent. In No. 397 the occipital base is very prominent. In No. 221 the hind-head is shelving, and the occipital protuberance sharply pointed. In No. 222 the occiput is shelving and protuberant. In No. 126 it is broad and flatly round. The flattened form of the occiput of No. 1242 is well shown in the wood-cut on p. 75 of the Catalogue. The three Chiric skulls in the collection have prominent and elongated occiputs. In the case of a Patagonian skull, the hind-head projects far behind the skull. The whole of the occipital region is full and tumid. In many of the crania which we have passed in review, the elongation of the occiput backwards is chiefly due to the great prominence of the occipital base. In the Patagonian head, this feature is not present. The hind-head of the Puelche girl is rather flat. The head of a Puelche, from the Rio Negro, figured by d'Orligny, has a truncated

occiput.* In all the Brazilian crania, the occipital region is more or less elongated and superiorly flattened, as in the Swedes.

There are nine aboriginal American skulls in the collection at Fort Pitt, Chatham. These are described by Dr. Williamson† in his catalogue. No. 47, from Lake Huron, has a rounded occiput. No. 68, skull of a North American Indian, has the occiput projecting. In No. 69 "the vertex and occiput are well arched." In No. 70 the occiput is rounded. In No. 71 "the vertex and occiput are well rounded." In No. 473, from Canada, the occiput is large and well rounded, and the space for the downward development of the brain in the occipital region is very great. No. 474, also from Canada, is a round skull. No special statement is made concerning the form of the occiput, but from the general description of the head, I consider it to be oval. In No. 475, a Flathead, "the occiput descends from the vertex abruptly, and almost perpendicularly to the foramen magnum." In No. 476, a Charib, from St. Vincent, "the vertex gradually slopes backwards and downwards to the occiput, which projects, and is narrow from above downwards; the occiput is very flat, and nearly the whole of the occipital bone rests upon a plane surface."

The late Dr. Morton, as is well known, regarded flatness of the occiput as a characteristic feature of the aboriginal American skull. In *Crania Americana* (page 65), he expressly says that "flatness of the occipital portion of the cranium will probably be found to characterize the greater or less number of individuals in every existing tribe, from Terra del Fuego to the Canadas. If these skulls be viewed behind, we observe the occipital outline to be moderately curved outwards, wide at the occipital protuberances, and full from those points to the opening of the ear. From the parietal protuberances there is a slightly curved slope to the vertex, producing a conical, or rather a wedge-shaped outline." He says, furthermore, that even in the elongated heads of the Lenapes, the Iroquois, Cherokees, Mandans, Rickarees, and Assinaboins, "the characteristic truncation of the occiput is more or less obvious." In another publication,‡ when alluding to the physical characteristics of the Indian tribes, he again speaks of "the flattened or vertical occiput" as a characteristic common to them all. In the 3d edition of his *Catalogue of Skulls of Man and the Inferior Animals*, Dr. M. briefly describes a very remarkable head, found by Dr. Davis and Mr. Squier, in a mound in the Scioto Valley, Ohio, and described and figured by them in their "Ancient Monuments of the Mississippi Valley," plates 47 and 48. Dr. M. regarded this head as the "perfect type of the Indian conformation, to which the skulls of all the tribes, from Cape Horn to Canada, more or less approximate. It possesses the national characteristics in perfection, as seen in the elevated vertex, flattened occiput, &c. Similar forms," he continues, "are common in the Peruvian tombs, and have the occiput as in this instance, so flattened and vertical as to give the idea of artificial compression: yet this is only an exaggeration of the natural form, caused by the pressure of the cradle-board, in common use among the American nations."

In his last contribution to craniography,§ Dr. Morton describes the typical Indian skull to be of a decidedly rounded form, with the occipital portion flattened in the upward direction.

Dr. Morton's opinion concerning the typical form of the occiput in the various tribes of American Indians, though very generally acquiesced in by craniographers, has not been accepted by all without qualification.

"L'inspection des crânes mexicains," writes Dr. Gosse, of Geneva, représentés dans les *Crania Americana* me semble prouver que chez ces derniers.

* L'Homme Americain. Atlas, Plate i. fig. 1.

† Op. cit. pp. 64-67, 83, 85.

‡ Inquiry into the Distinctive Characteristics of the Aboriginal Race of America, p. 5.

§ The Physical Type of the American Indians.

le développement de l'occiput n'est point tel d'être assez générale et aussi saillante que pour les Indes et que chez les crânes examinés par Morton, ou dans plusieurs d'entre eux. La tête est plutôt remarquablement développée au vertex. "Ce qui se trouve," he continues, "c'est qu'un développement de la transmission héréditaire, Morton n'a pu lui donner un rôle plus positif à l'égard du langage de ce genre de l'homme, le compagnon des peuples nomades ou l'occupant du désert de la tête, qu'il considère comme un caractère normal du type américain."²

Dr. J. H. Davis also writes that though "this position of Morton's is on whole founded in truth, yet it must be allowed to be false to numerous exceptions." His skulls appear to have been weakened by the fact which he mentions, that the crania of Americans, figured by Huxley and Mivart, (two of them given as a typical skull), are both distinguished by a considerable occipital projection.†

Prof. Daniel Wilson, of Canada, in a recent interesting paper on the cranial type of the American Aborigines, tells us that he has carefully examined twelve also Indian skulls, three only of which he regards as brachycephalic. "One of these three, a very remarkable and massive skull, was found up at Huron, on Lake Simcoe, while, it is said, upwards of two hundred others. It differs from all the other Indian crania, in exhibiting the vertical instead of very strikingly, that when held resting on it, it stands more firmly than in any other position." He thinks there can be little doubt that the flattened aspect of this skull is the result of artificial compression of a much more decided nature than that of the cradle-board of the papoos.

Further on, he says, "I am struck, in the majority of the examples examined, with the total absence of any approximation to the flattened occiput." Fifteen of the crania referred to exhibit a more or less decided posterior projection of the occiput, twelve of these being markedly so, and seven of these presenting such a projection as to be considered one of the most striking features in one class of ancient Scottish crania, which chiefly led to the suggestion of the term *Knochengale*."§ * * * "I think it extremely probable that further investigation will tend to the conclusion that the vertical or flattened occiput, instead of being a typical characteristic, points rather to the class of artificial modifications of the natural crania familiar to the *Knochengale* craniologist, either in the discovery of ancient graves, and in the customs of widely separated living tribes."

From the details which I have presented above, it will be seen that the opinions upon this subject, advanced by Dr. Morton, cannot be maintained by the aboriginal American crania in the Academy's collection. The vertically flattened occiput is by no means a distinctive character of these crania; on the contrary, it is only an occasional feature among them, and is exhibited also by the skulls of other, and distant races of men. In fact, the occipital portion of our American Indian skulls exhibits quite a variety of forms. In some, as we have already seen, the flattening is located superiorly, affecting equally the posterior superior part of the *occiput parietalis*, and the upper part of the *occipitalis*; in others, and they are comparatively few, the flattening is directly behind, and is vertically in a third variety the flattening is confined solely to the basal portion of the occipital bone. In some of the skulls the occiput is evenly rounded, in the direction of the longitudinal sphenoid, the transverse diameter, behind the busy mouth, being comparatively small; in others it is full and globular. If the reader will place the *Cross* measurements before him, and compare together the outline representations of the posterior part of the skull in the different tribes of Indians, he will be struck with the

² *Essai sur les Déformations Artificielles du Crâne*. Paris, 1855, pp. 72, 74.

† *Crania Britannica*, Decade 3, p.

‡ *Canadian Journal of Industry, Science, and Art*. November, 1887, pp. 424, 425.

§ *Prehistoric Annals of Scotland*, p. 109.

inference of form which they exhibit. In some it is higher than broad: in others it is broader than high: in others again, the greatest breadth is between the parietal bosses: in a fourth variety the greatest breadth coincides with the base. In some, the contour of the hind head is almost square: in some almost circular: in some oblong: in others triangular, and in others still, pentagonal or very irregular. Now, none of these forms are diagnostic of the Indian skull. Indeed, they all appertain to the races of the Eastern continent, as well as to those of the Western.

It is very well known to craniographers that Dr. Morton, as early as 1846, pointed out the existence of at least four different forms of the Peruvian skull, all of which he regarded as artificial deformations, although in his *Crania Americana*, published long before, he contended that these forms were natural and congenital. Five years later, Dr. Rivero and Tschudi, without appearing to be aware of the views of Dr. Morton, arrived at the same conclusion—that these peculiar forms were congenital, and that there were four varieties of them. Now, in all these varieties the occiput, as might be expected, varies in form. One variety is very well shown in plate 2 of *Crania Americana* (No. 496 of the Catalogue), and also in the wood-cut representing No. 1277 of the Catalogue. This form of occiput is also seen in Nos. 1275, 1279, 1280, 1281, 1282, 1284, 1363, 1364, 1366, and many others. A very different form of the whole head, and of the occiput, which is flatly rounded, is seen in plate 7 of *Crania Americana*, representing a Peruvian, from Santa. No. 1276 exhibits a similar occiput. In his interesting work entitled *Three Years in the Pacific*, Dr. Ruschenberger alludes to the peculiarities of form shown in Peruvian skulls. He says that in many of the crania obtained by him at Santa, the occiput “is almost vertical, and rises quite abruptly from the great hole at the base” (p. 374). In plate 4 of *Crania Americana*, it will be seen that the occiput is much fuller and rounder than in the last specimens. Just such a form of the occipital region is represented in Nos. 1278, 1282, 1365, and 1366. Nos. 13, 30, 75, 77, 84, 85, 86, 87, 93, 95, 97, 446, and many others, are asymmetrical skulls, flattened behind in a manner more or less like one or other of the forms represented in plates 8, 11, and 11 B, of *Crania Americana*. In other skulls of this great Toltec group, the occipital flatness is almost vertical, and at the same time symmetrical, as above intimated. The superiorly flattened or shelving occiput is seen in some of the Peruvian skulls, as in Nos. 571, 631, and others. No. 696 has an occipital region very much like that figured in Vimont’s Atlas, plate 96, fig. 2: while Nos. 1420, 1425, and all the casts of skulls found on the Island of Titicaca, resemble, in the conformation of the occiput, the cranium represented in Table I of Fitzinger’s Essay *Ueber die Schädel der Avarer*.

The skulls of Aymaras, from Bolivia and Peru, figured by D’Orbigny, have projecting occiputs.*

The Mexican crania in the Academy’s collection differ from each other in the form of the occipital region.

A female skull (34), of this great family, obtained from Acapacingo, in the Valley of Cuernavaca, about fifty miles south of the City of Mexico, and regarded by Morton as belonging to the Tlachuic nation, exhibits an occiput moderately full and somewhat flattened above the slightly protuberant occipital boss. Two ancient Mexican crania (734, 735), exhumed near the Indian village of Guahapan, on the Mountain Popocatepetl, and perhaps of Aztec origin, differ in the shape of the hind head. No. 734 is asymmetrical, the right half of the occiput being flattened and pressed forward, while the left is undisturbed. The hind-head, as a whole, however, is full; and were it not for the lateral flattening, might be regarded as rounded, or even almost globular. In 735, on the other hand, the hind-head is narrower, and owing

* L’Homme Americain. Atlas.

to the strong development of the occipital protuberance, quite prominent, and somewhat shelving from above downwards and backwards. Two skulls (714, 715), from an ancient Mexican cemetery, at Ocuilula, were full and more or less rounded occiputs. In another skull from Ocuilula (716), the hind-head is much more protuberant. (See *Osseous Remains*, plates 69, 70, and 81.) In three crania (717, 718, and 720) from an ancient tomb at Tazumba, the hind-head is high, broad at the base, and the whole occipital boss prominent. The general form of the occipital region is shown in the outline worked out at the bottom of p. 234 of *Osseous Remains*. Two Otomian crania (1023 and 1000), possess the same form of occiput. Three other Otomian skulls (1001, 1002, and 1003), have the hind-head elongated and shelving, and the occipital protuberance projecting very much. A short Tlascalan skull (1004), has a full and globular occiput. In the remainder of the Chalcocoman female (1005), from a mound at Texcoco, the occiput is more like that of Nos. 1001, 1002, and 1003 of the Otomian group. No. 1228, in the collection of the Academy, is the skull of a Mexican, from the cemetery at Santiago de Tlatililco, near the City of Mexico. In this cemetery, many thousands of the natives were interred after the brave defense of their city against Cortes. It is probable, therefore, that the individual to whom the skull belonged, stood up manfully in resistance to Spanish aggression. The hind-head is broad and very much flattened in the posterior parietal and upper occipital portions. The well-marked transverse ridge forms a prominent dividing angle between the superior and inferior portions of the occiput. The occiput of the two Panos skulls (681, 1313), from San Lorenzo, near the City of Mexico, is much like that of 1228 and 1000 of the Otomian group. In the skull of an ancient Mexican chief (1444) exhumed together with various aboriginal arms and ornaments, from the Cerro de Quetzilco, near the City of Mexico, the occiput is of a peculiar form. It is broad, but has very little vertical diameter, owing to the flatness of the cranium. The whole head looks as if it had been compressed between two opposing forces, one applied at the top and the other at the base of the occiput. In No. 882 the occipital region is flat, very high, and comparatively narrow. Owing to the parallelism of the two sides, it is oblong from above downwards. No. 234, said to be taken from the great Altar of Sacrifices at Mexico, is remarkably flattened behind, and chiefly to the right of the median line. The occiput of 1859 is singularly distorted. A broad and deep suture or fissure extends in the median line, from a little below the normal suture, entirely back to the *Crusium magnum*, dividing the whole calvaria into two lobes. The occiput in 1500 is full and rounded. Of the two types skulls, No. 1346 has a full and regularly rounded occiput; No. 1346 a longer and more protuberant one. The remainder of the Mexican crania enumerated in the catalogues, from 1515 to 689, have full, and more or less protuberant occiputs.

No. 722, from the tomb-dol of San Jacinto, in Texas, exhibits a very peculiar form.

Since this age, Dr. E. H. Abbe, of the United States Army, presented to the Academy a series of six crania procured in New Mexico. These skulls are of considerable interest. Two of them, Nos. 1002 and 1003, were obtained from the ruins of Great Quivira, New Mexico, by Major Carleton, who explored the ruins thoroughly. No. 1004 was discovered by Dr. Abbe, from the centre of the ruins of the church at Ouarra, New Mexico. No. 618, a fragmentary skull, was found, with many other human remains, in a very bad state of preservation, in making excavations in an old field in Santa Fe, New Mexico. "This head," writes Dr. Abbe, "and the accompanying remains, evidently belonged to the same race of Indians which peopled the numerous population of the large towns, long since in ruins, and of which no little is known, at Great Quivira, Abo, Ouarra, Pecos, Old Urich, &c."

All these heads are brachycephalic, and in all of them the occiput forms

or less flattened. No. 1032 exhibits a perpendicular or wall-like flatness of the hind-head. Nos. 1034 and 931 are asymmetrical. In the first the occiput is flattened, chiefly to the right of the median line; in the other mainly to the left. No. 930, the skull of a Puéblo Indian, taken from the church-yard of the village of Laguna, and 1035, the skull of Jose Largo, a Mescalero chief, who was killed in an affray near Bosque Redondo, not far from the Pecos river, New Mexico, are both dolichocephalic heads. The occiput of the first is shelving; that of the second, rounded.

The Academy's collection contains three other New Mexican heads, which were procured and forwarded by Mr. Geo. Gibbs to Dr. J. H. B. McClellan, who placed them in the Museum of the Academy. One, of them (No. 935), is the skull of a chief of the Mogoyon Apache Indians, who was killed by the Navajó Indians, in a little ravine leading up the side of the Mesa de los Lobos, to the right of the Fort Defiance road, and at the head of Canon del Gallo, New Mexico. The occiput of this skull is prominent, and somewhat inclined from above downwards and backwards. No. 936 is the skull of a Navajó* Indian, picked up on the road leading from Albuquerque to Fort Defiance, at a place called the "Lake," situated on the Pacific slope of the Rocky Mountains, six miles from the summit. In the cranium, the occipital region is flatly round. No. 937, the skull of a Puéblo† Indian, of Laguna, New Mexico, possesses a vertically flattened occiput.

The negro crania in the Museum of the Academy, exhibit a remarkable agreement in the shape of the occipital region. Of the group marked "American born," in the Catalogue, Nos. 1, 2, 69, 74, 421, 548, 1301, 1302, 1318, 1320, 235, and 236, are all oblong heads, with prominent, and more or less shelving occiputs. In Nos. 74 and 548 the basal portion of the occipital bone is very much compressed or flattened, like some of the Malay skulls. Nos. 549, 900, and 984 of this group have the occiputs more or less rounded. With the exception of Nos. 580, 1098, and 1101, in which the occiput is flattened at the base, and No. 1093, the occipital region of which is full and rounded, all the skulls of the native African group in the collection are long heads with prominent occiputs, which in form are sometimes shelving or inclined, sometimes oval, and occasionally narrow, and somewhat acuminate. The same statement applies in great measure to the two Hovah, and all the Australian skulls in the collection. No. 435, an Oceanic negro, is a short head, with the occiput inferiorly flattened. No. 1343, a Tasmanian from Van Diemen's Land, has a protuberant occipital region.

In table 6, 7, and 8 of Blumenbach's *Decades Craniorum*, the protuberant occiput of the negro is very well shown. In tables 17, 18, and 19, the form varies in several respects. The normal form of the negro occiput, and that to which the great majority of the African skulls in the Academy's collection conforms, is well illustrated in plates 2 and 3 of Prof. Van der Hoeven's valuable treatise entitled "*Bijdragen tot de Natuurlijke Geschiedenis van den Negerstam*." The protuberant occiput of the Ethiopian is also exhibited in

* "This tribe," writes a valued correspondent, Mr. Geo. Gibbs, "is said to number 200 souls, and to be a decidedly pastoral people, having in their possession at the present time (July, 1857), 60,000 horses, and 350,000 sheep. They can bring 2500 warriors into the field at one time. Their skulls are exceedingly difficult to procure, on account of their habit of stowing the dead away in hidden places."

† "These Indians," says Mr. Gibbs, "get their name from the Spanish word *puéblo*, because they live in little towns or villages, cultivating the soil in the neighborhood of the same. It is said that New Mexico boasts of twenty-seven of these *puébls* at the present time, differing in population from 40 to 2,500 souls. Some of the principal *puébls* are named Puéblo of Taos, Zuni, Laguna, San Felipe, Santa Domingo, Sandia, Isleta, and Acoma. With but few exceptions, the inhabitants speak different languages, though all of them use the Spanish. Nominally they are Catholics, having chapels in their midst, yet they continue to worship Montezuma (whom they believe to be residing in the sun), day and night, by means of never ceasing religious dances."

table 7 of Dr. Lucae's "Organischen Formenlehre," a work containing many interesting craniographic details.

From the foregoing facts we may conclude :—

1. That the form of the human occiput is not constant. On the contrary, it varies continually in the different races and tribes of men. It varies, also, to a greater or less extent, among the individuals of the same race or tribe.

2. That the different occipital forms may be divided into five classes or groups, which are reducible, however, to three. These are, 1st. The protuberant or prominent occiput, with the upper or parietal half somewhat flattened, so as to present an inclined or shelving appearance. (See p. 399.) 2d. The vertically flattened. 3d. The inferiorly flattened or compressed, in which the basal portion of the occiput slants upwards and backwards, as is shown in a strongly marked degree, in the Sandwich Islander head, fig. 69, on page 340 of "Indigenous Races of the Earth." 4th. The round. And 5th. The globular. As the last two merge more or less into each other, and as the third form may be regarded as, in many instances, a modification of the second, these five forms may, with greater simplicity, be thrown into three groups, viz. :—1st. The prominent and oval, or superiorly inclined. 2d. The perpendicularly flattened. And 3d. The more or less round or globular.

3. That to the first of these groups belong the Norwegians, Swedes, and some other Scandinavians; the Frisians and Batavians,* among the low Germans; the Anglo-Saxons and Anglo-Americans, the form of the occiput in these being between that of the Swedes and Germans; the Celtic Irish, and some tribes of the ancient Britons; the Phœnicians, Circassians, Armenians, Affghans, Baluchi; some of the Egyptians and Arabs, the Fellahs, Abyssinians, and Guanchés of the Canary Isles; some of the Hindoos and Chinese; the Loo-Chooans, certain Malays; the Eskimos, Kamaskatkans, Reindeer Tungus, Icelanders, Tchuktehi, Unalaschkans, some of the Kanakas, Tahitians, and others of the Sandwich Islands, Marquesans, of Nukahivah, New Zealanders, Feejeeans, and most of the African tribes. Among the aboriginal Americans, this form is exhibited by the Arickarees, Assinaboins, Cherokees, Chippeways; some of the Kootenays, Creeks, and Dacotas; by the Hurons, and probably the Illinois; by some of the Iroquois and most of the Lenapes; by the Mandans, Minetaris, Menominees, Miamiis, Mohawks, and most of the Narragansetts, the Naticks, some of the Osages, Ottawatomes, Pawnees, and Sauks; by most of the Seminoles, by the Shawnees, Shoshone, Upsarookas, Californians, Cayugas, Cheyennes, Choctaws, Massasaugas, Mingos, Naumkeags, Mayas of Central America; by some of the Araucanians, the Charibs, Patagonians, Brazilians, Aymaras, and by some of the ancient Mound Builders, Peruvians, and Mexicans.

In the kumbekephalic variety of skulls, this form of occiput is often very much exaggerated, as is seen in certain ancient Cimbric, Ostrogoth, and Burgundian heads; in some Egyptians and Celtic Irish, and in one Creek Indian skull.

4. That of the second form of occiput, or that in which the hind-head is more or less vertically flattened, we find examples in some of the ancient inhabitants of Scandinavia; the Lapps, Samoiedes, Iberians, or Basques of the Pyrenees; the ancient Pelasgi; Cossacks, Hungarians, Candaharians, some Arabs; one Chinese, the Siamese, some Malays and Javanese; certain tribes of the Transgangetic, or Indo-Chinese Peninsula, and occasionally among the Tahitians. To this group belong, also, the skulls of Chetimache, Natchez, Otoo, Kenehawha, Oneida, Seneca, and Puelche Indians; likewise a portion of the Kootenays, Lenapes, Miamiis, Osages, Ottawas, Pottawatomes, Shoshones, Araucanians, Peruvians, and the majority of the Mound Builders.

Examples of the inferiorly flattened modification of, or deviation from this type, are found in some of the Malays, Polynesians, &c.

* See Catalogus Craniorum Diversarum Gentium quæ Collegit, J. Van der Hoeven, p. 14.

5. That the third form, in which the occiput is full and rounded, or globular, comprises the Danes, Finns, Esthonians; the short-headed Germans, whose crania, in general conformation, occupy a place between those of the Swedes and Finns; the Dutch, some tribes of the ancient Britons; the Slaves, Turks, Greeks, Romans, Etruscans, Persians, ancient Assyrians, some of the Egyptians, Hebrews, Copts, Hindoos; some of the Chinese, Japanese, Burmese, Malays; the Kalmucks, Burats, and some of the Kanakas. To this group belong, of the American Indians, the Ottigamies, Penobscots, Winnebagoes, Yamasees, Chemasyans, Eucheas, Nanticokes, Pocassetts, Quinipiacks, or Mohegans, and a portion of the Cheyennes, Creeks, Dacotas, Iroquois, Narragansetts, Pawnees, Pottawatomies, Sauks, Seminoles, Araucanians, Peruvians, and Mound Builders.

6. That the shelving or oval form of the occiput is most common in the dolichocephalic heads, and as these predominate in number over the brachycephalic, it is the most common form of all. Next comes the round or globular, and lastly the vertically flat—both these forms prevailing in the brachycephala.

7. That there is a marked tendency of these forms to graduate into each other, more or less insensibly. None of these forms can be said to belong exclusively to any race or tribe. None of them, therefore, can be regarded as strictly typical, for, a character or form, to be truly typical, should be exclusive and constant.

